

# The Effects of Banking Competition on Growth and Financial Stability: Evidence from the National Banking Era

Mark Carlson, Sergio Correia, and Stephan Luck<sup>1</sup>

September 7, 2018

Views do not necessarily represent views of the Federal Reserve

---

<sup>1</sup>Federal Reserve Board

# Research question

How does **competition in banking** affect

1. Credit provision?
2. Financial stability?
3. Real economic outcomes?

# What do we know? (Theory)

→ Competition may lead to more (less) lending and more (less) risky lending

## • Credit supply

- Standard IO argument: competition increases credit  
(Klein, 1971)
- Relationships matter: competition decreases credit  
(Petersen and Rajan, 1995)

## • Risk taking

- Monopolist decreases risk to protect charter value  
(Keeley, 1990)
- Monopolist increases rates and lending becomes more risky  
(Boyd and DeNicolo, 2005)

# What do we know? (Theory)

- Competition may lead to more (less) lending and more (less) risky lending
- Credit supply
  - Standard IO argument: competition increases credit (Klein, 1971)
  - Relationships matter: competition decreases credit (Petersen and Rajan, 1995)
- Risk taking
  - Monopolist decreases risk to protect charter value (Keeley, 1990)
  - Monopolist increases rates and lending becomes more risky (Boyd and DeNicolo, 2005)

## • Synthesis

Depends on stage of development of economy

(Cecchetti and Pagan, 2002; Martinez-Miera and Repullo, 2010)

# What do we know? (Theory)

→ Competition may lead to more (less) lending and more (less) risky lending

- Credit supply
  - Standard IO argument: competition increases credit (Klein, 1971)
  - Relationships matter: competition decreases credit (Petersen and Rajan, 1995)
- Risk taking
  - Monopolist decreases risk to protect charter value (Keeley, 1990)
  - Monopolist increases rates and lending becomes more risky (Boyd and DeNicolo, 2005)
- Synthesis
  - Depends on stage of development of economy (Cetorelli and Peretto, 2012; Martinez-Miera and Repullo, 2010)

# What do we know? (Empirical evidence)

- **Identification challenge:** competition and concentration are not exogenous
  - Most evidence based on lifting of branching restrictions  
(Jayaramine and Strahan, 1996, 1998; Black and Strahan, 2002; Cokerelli and Strahan, 2006; Dick and Lehnert, 2010; Jiang et al., 2016)

# What do we know? (Empirical evidence)

- **Identification challenge:** competition and concentration are not exogenous
- Most evidence based on lifting of branching restrictions  
(Jayaratne and Strahan, 1996, 1998, Black and Strahan, 2002; Cetorelli and Strahan, 2006; Dick and Lehnert, 2010; Jiang et al., 2016)

## • Confounding factors

### • Ability to diversify geographically

(Goetz et al., 2014)

### • Political economy of bank mergers

(Agarwal et al., 2012; Calomiris and Haber, 2014)

# What do we know? (Empirical evidence)

- **Identification challenge:** competition and concentration are not exogenous
- Most evidence based on lifting of branching restrictions  
(Jayaratne and Strahan, 1996, 1998, Black and Strahan, 2002; Cetorelli and Strahan, 2006; Dick and Lehnert, 2010; Jiang et al., 2016)
- Confounding factors:
  - Ability to diversify geographically  
(Goetz et al., 2016)
  - Political economy of bank mergers  
(Agarwal et al., 2012; Calomiris and Haber, 2014)



# Why the National Banking Era? (1864–1913)

## 1. Little government interference

- No deposit insurance
- No bailouts
- No lender of last resort
- No mergers

Prevalence of unit banking (no branching) ensures local banking markets

# Why the National Banking Era? (1864–1913)

## 1. Little government interference

- No deposit insurance
- No bailouts
- No lender of last resort
- No mergers

## 2. Prevalence of unit banking (no branching) ensures **local banking markets**

## 3. Capital regulation gives rise to exogenous variation in barriers to entry

# Why the National Banking Era? (1864–1913)

## 1. Little government interference

- No deposit insurance
- No bailouts
- No lender of last resort
- No mergers

## 2. Prevalence of unit banking (no branching) ensures **local banking markets**

## 3. Capital regulation gives rise to **exogenous variation in barriers to entry**

→ Close to ideal laboratory

# Why the National Banking Era? (1864–1913)

1. **Little government interference**
    - No deposit insurance
    - No bailouts
    - No lender of last resort
    - No mergers
  2. Prevalence of unit banking (no branching) ensures **local banking markets**
  3. Capital regulation gives rise to **exogenous variation in barriers to entry**
- ⇒ Close to ideal laboratory

## Strategy: Exploit discontinuity in capital requirements during National Banking Era

- Minimum capital (equity) required **to open a bank**

– Based on the legal population of town/city at time of founding

– “Legal population” based on the last decennial census

## Strategy: Exploit discontinuity in capital requirements during National Banking Era

- Minimum capital (equity) required **to open a bank**
- Based on the legal population of town/city at time of founding
  - “Legal population” based on the last decennial census

In dollar terms, not as a ratio:

$$\text{“Capital stock paid in”} \geq \begin{cases} \$50,000 & \text{if population} \leq 6,000 \\ \$100,000 & \text{if population} \in (6,000, 50,000] \\ \$200,000 & \text{if population} > 50,000 \end{cases}$$

## Strategy: Exploit discontinuity in capital requirements during National Banking Era

- Minimum capital (equity) required **to open a bank**
- Based on the legal population of town/city at time of founding
  - “Legal population” based on the last decennial census
- In dollar terms, not as a ratio:

$$\text{“Capital stock paid in”} \geq \begin{cases} \$50,000 & \text{if population} \leq 6,000 \\ \$100,000 & \text{if population} \in (6,000, 50,000] \\ \$200,000 & \text{if population} > 50,000 \end{cases}$$

• Capital requirements don't affect existing banks; act as barriers to entry

• Sylla (1969), James (1978)

• Exploit publication of 1880 decennial census, which shifted the population of some towns above the 6,000 threshold

## Strategy: Exploit discontinuity in capital requirements during National Banking Era

- Minimum capital (equity) required **to open a bank**
- Based on the legal population of town/city at time of founding
  - “Legal population” based on the last decennial census
- In dollar terms, not as a ratio:

$$\text{“Capital stock paid in”} \geq \begin{cases} \$50,000 & \text{if population} \leq 6,000 \\ \$100,000 & \text{if population} \in (6,000, 50,000] \\ \$200,000 & \text{if population} > 50,000 \end{cases}$$

- Capital requirements don’t affect existing banks; act as barriers to entry
  - Sylla (1969), James (1978)
- Exploit publication of 1880 decennial census, which shifted the population of some towns above the 6,000 threshold



# Findings

## 1. Competition **increases credit provision**

- Banks increase credit provision to deter potential entrants

## 2. Competition increases risk taking

- Trade-off between credit provision and financial stability
- \* Higher leverage
- \* Seize more collateral
- \* More likely to fail during major financial crisis (Panic of 1893)

# Findings

## 1. Competition **increases credit provision**

- Banks increase credit provision to deter potential entrants

## 2. Competition **increases risk taking**

→ Trade-off between credit provision and financial stability

- Higher leverage
- Seize more collateral
- More likely to fail during major financial crisis (Panic of 1893)

## 3. Increased credit provision correlates with economic growth

# Findings

1. Competition **increases credit provision**
  - Banks increase credit provision to deter potential entrants
2. Competition **increases risk taking**
  - Trade-off between credit provision and financial stability
  - Higher leverage
  - Seize more collateral
  - More likely to fail during major financial crisis (Panic of 1893)
3. Increased credit provision correlates with **economic growth**

# Data: OCC Annual Report to the Congress (1867-1904)

## REPORT OF THE COMPTROLLER OF THE CURRENCY. 737

### NEW YORK.

#### Chase National Bank, New York.

H. W. CANNON, *President.*

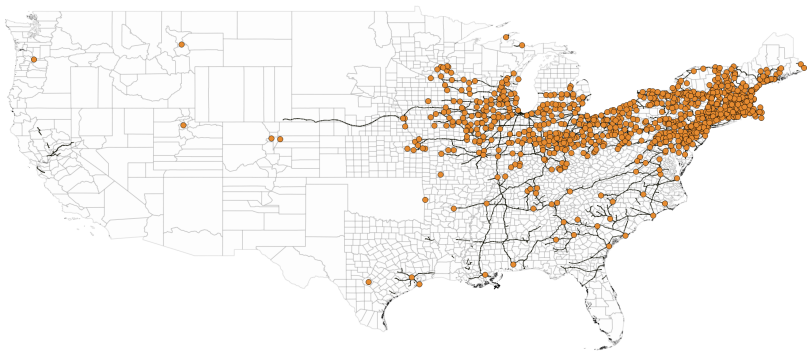
No. 2370.

J. T. MILLS, JR., *Cashier.*

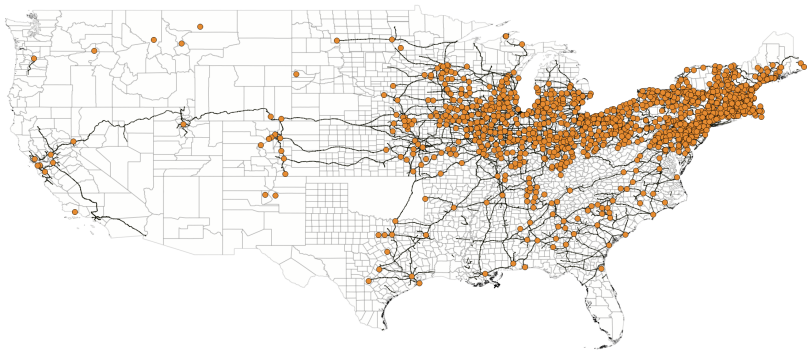
Resources.		Liabilities.	
Loans and discounts.....	\$14,954,408.80	Capital stock paid in.....	\$500,000.00
Overdrafts.....	4,683.41	Surplus fund.....	1,000,000.00
U. S. bonds to secure circulation...	50,000.00	Undivided profits, less current	
U. S. bonds to secure deposits.....	200,000.00	expenses and taxes paid.....	284,769.70
U. S. bonds on hand.....	167,350.00	National bank notes outstanding.	45,000.00
Premiums on U. S. bonds.....	26,782.06	State bank notes outstanding.....	
Stocks, securities, etc.....	2,882,266.11	Due to other national banks.....	9,309,113.60
Bank's house, furniture, and fixtures		Due to State banks and bankers..	9,312,523.30
Other real estate and mortg's owned		Dividends unpaid.....	
Due from other national banks.....	759,750.57	Individual deposits.....	4,641,779.71
Due from State banks and bankers.	239,149.84	Certified checks.....	153,674.33
Due from approved reserve agents.		United States deposits.....	
Checks and other cash items.....	5,855.93	Deposits of U.S. disbursing officers.	110,450.36
Exchanges for clearing house.....	375,878.15	Notes and bills rediscounted.....	
Bills of other national banks.....	45,250.00	Bills payable.....	
Fractional currency, nickels, cents.	262.13	Liabilities other than those above	
Specie.....	739,586.00	stated.....	
Legal-tender notes.....	883,838.00		
U. S. certificates of deposit.....	4,020,000.00		
Redemption fund with Treas. U. S.	2,250.00		
Due from Treasurer U. S.....			
Total.....	25,357,311.00	Total.....	25,357,311.00

(111,097 balance sheets for 7,115 banks in 38 years)

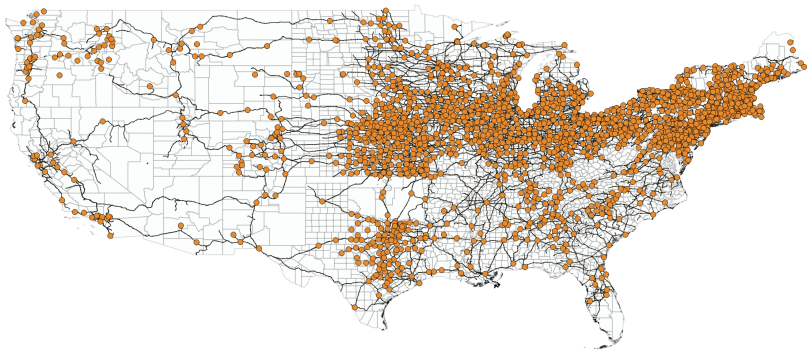
## The national banking system in 1870



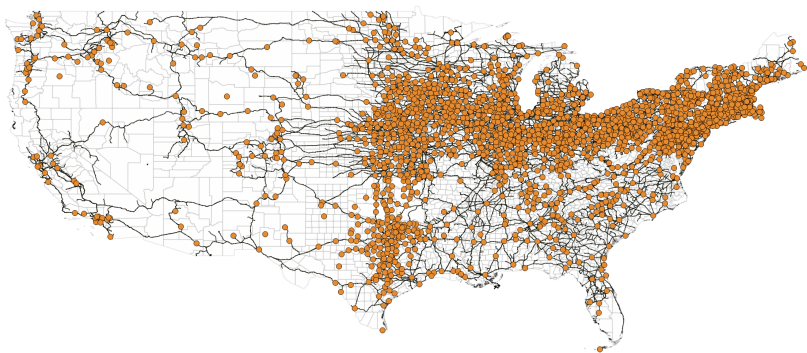
## The national banking system in 1880



## The national banking system in 1890



## The national banking system in 1900





# Data

- OCC's annual "Call Reports"
  - Data for **all** national banks from 1867 to 1904
- Population from Schmidt (2017)
- Manufacturing outcomes from Haines (2004)
- Railroad connections from Atack (2013)
- State chartered banks from Jaremski and Fishback (2018)

# Sample I

- Study the publication of the 1880 population census (March 3, 1882)
  - Exclude towns that when the 1880 census was published
    - Had no national banks
    - Were already above the 6,000 threshold

# Sample I

- Study the publication of the 1880 population census (March 3, 1882)
- Exclude towns that when the 1880 census was published
  - Had no national banks
  - Were already above the 6,000 threshold

Exclude West and former Confederate states

# Sample I

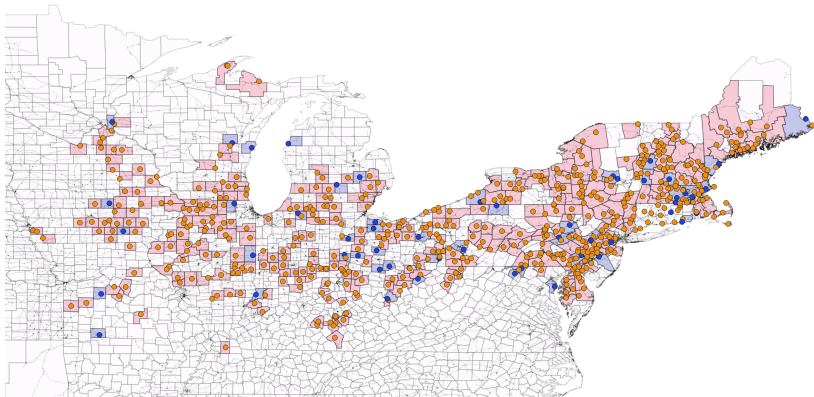
- Study the publication of the 1880 population census (March 3, 1882)
- Exclude towns that when the 1880 census was published
  - Had no national banks
  - Were already above the 6,000 threshold
- Exclude West and former Confederate states

• Focus on behavior of incumbent banks, with unchanged capital requirements

# Sample I

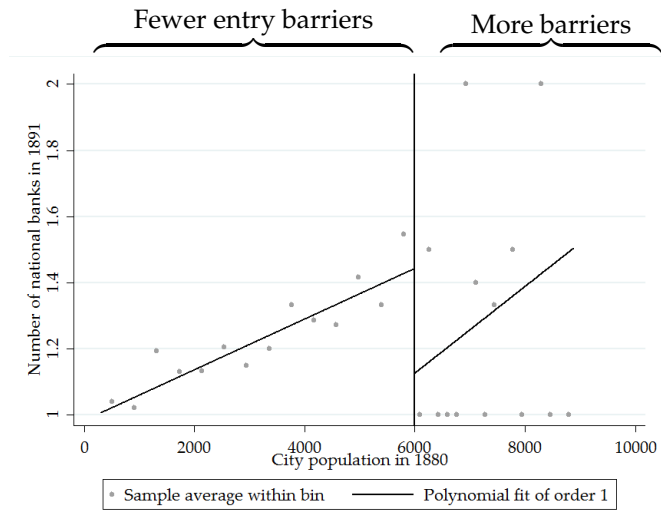
- Study the publication of the 1880 population census (March 3, 1882)
- Exclude towns that when the 1880 census was published
  - Had no national banks
  - Were already above the 6,000 threshold
- Exclude West and former Confederate states
- Focus on behavior of incumbent banks, with unchanged capital requirements

## Sample II



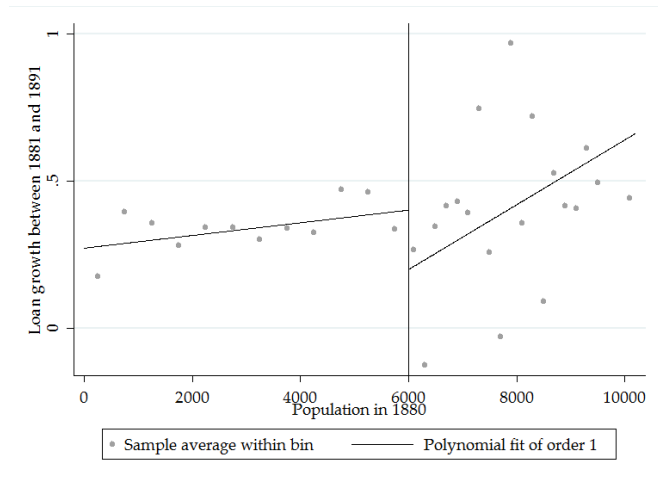
- Treated cities (blue) are either larger to begin with or grow faster
- Similar in railroad access and manufacturing

## Bank entry: Fewer national banks on towns above the threshold by 1891



- After 10 years, about 0.2 fewer banks in towns that cross the threshold
- Similar results when including state-chartered banks

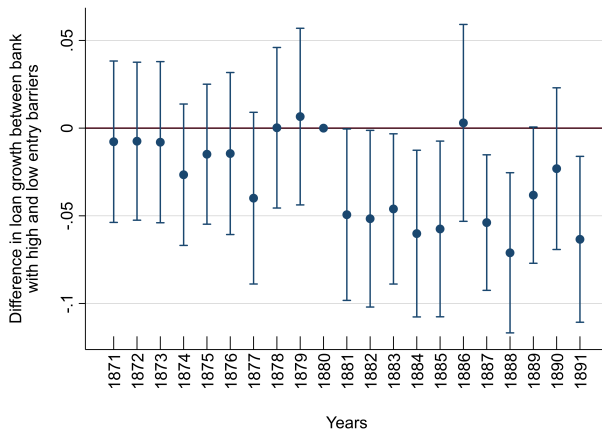
## Credit supply I: Ten-year growth of loan portfolio



- 22% lower loan growth over the ten-year period

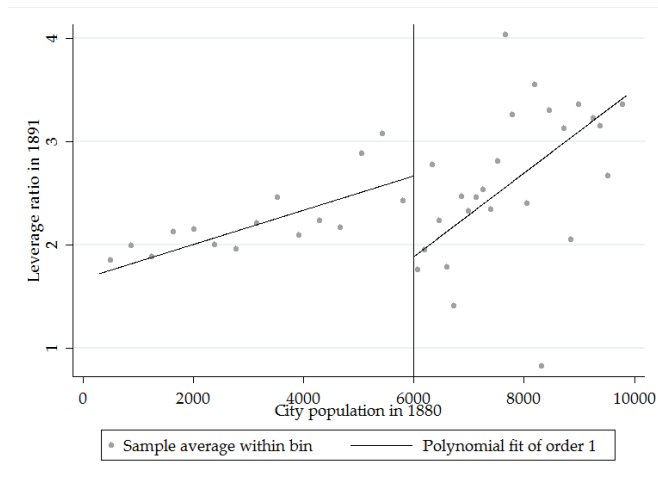


## Credit supply II: Dynamics



- Incumbents contract lending when the census is published, not gradually through the next ten years

## Risk taking I: Leverage in 1891

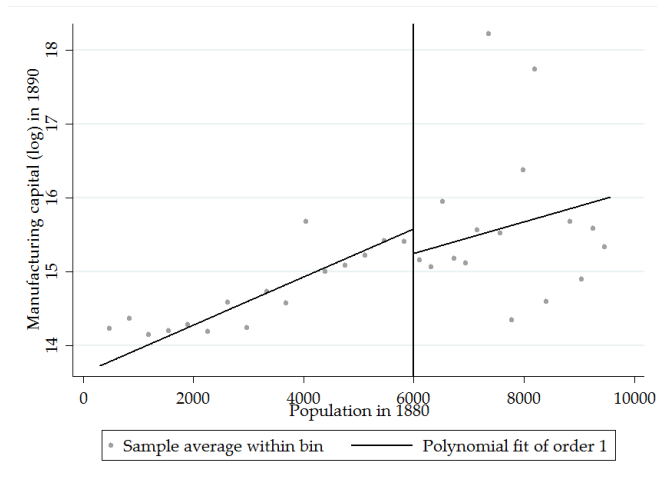


- Incumbents in towns that cross the threshold have 27% lower leverage

## Risk taking II: Ex-post measures of risk

- Leverage does not necessarily reflect risk taking
- To corroborate finding we show that competitive banks
  - seize more collateral
  - twice as likely to fail during financial crisis (Panic of 1893)

## Real effects: Manufacturing capital in 1890



- Banks that cross the threshold have a 17% slower growth in manufacturing capital

# Summary

- Identifying **causal effects of banking competition** is extremely challenging
  - National Banking Era is a close to ideal laboratory
- **Findings:**
  - Banks in towns with higher barriers to entry are more sound, but at the cost of a slower loan growth
  - Real effects: increasing barriers to entry reduces local manufacturing capital
- **Implications:**
  - Trade-off between credit growth and financial stability
  - Regulations increasing charter values could depress credit but increase stability
  - Especially relevant in lightly regulated parts of financial sector